

CLAIMS

1. An aqueous vulcanizable adhesive composition, which comprises a phenol resin emulsion prepared from a water-insoluble phenol resin solution in methyl ethyl ketone and an aqueous water-soluble polymeric substance solution, and a curing agent for phenol resin.

2. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the phenol resin emulsion comprises 5 to 25 wt.% of water-insoluble phenol resin, 0.2 to 6 wt.% of water-soluble polymeric substance, and 3 to 40 wt.% of methyl ethyl ketone, the balance being water.

3. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the content of methyl ethyl ketone is not more than 10 wt.%.

4. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the water-insoluble phenol resin is a novolak type phenol resin or a mixture of a novolak type phenol resin with a resol type phenol resin.

5. An aqueous vulcanizable adhesive composition according to Claim 4, wherein not more than 200 parts by weight of the resol type phenol resin is used on the basis of 100 parts by weight of the novolak type phenol resin.

6. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the water-insoluble phenol resin is used as a solution at a concentration of 40 to 60 wt.% in methyl ethyl ketone.

7. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the water-soluble polymeric substance is polyvinyl alcohol.

8. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the water-soluble polymeric substance is acetoacetyl-modified polyvinyl alcohol.

9. An aqueous vulcanizable adhesive composition according to Claim 5, wherein an organometallic compound is further contained.

10. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the curing agent for phenol resin is hexamethylenetetramine.

11. An aqueous vulcanizable adhesive composition according to Claim 10, wherein 0.1 to 5 parts by weight of the hexamethylenetetramine is used on the basis of 100 parts by weight of the phenol resin emulsion.

12. An aqueous vulcanizable adhesive composition according to Claim 10, wherein water is used together with hexamethylenetetramine.

13. An aqueous vulcanizable adhesive composition according to Claim 13, wherein not more than 1,000 parts by weight of the water is used on the basis of 100 parts by weight of the phenol resin emulsion.

14. An aqueous vulcanizable adhesive composition according to Claim 1, for use in vulcanization bonding of a metal or resin to rubber.

15. An aqueous vulcanizable adhesive composition according to Claim 14, wherein the rubber is nitrile rubber, hydrogenated nitrile rubber or acrylic rubber.

16. A composite of rubber and metal or resin vulcanization bonded by an aqueous vulcanizable adhesive composition according to Claim 1.

17. A phenol resin emulsion prepared from a water-insoluble phenol resin solution in methyl ethyl ketone and an aqueous water-soluble polymeric substance solution.

CLAIMS

1. (As amended) An aqueous vulcanizable adhesive composition, which comprises a phenol resin emulsion prepared from a water-insoluble phenol resin solution in methyl ethyl ketone and an aqueous water-soluble polymeric substance solution, and a curing agent for phenol resin, the content of methyl ethyl ketone being not more than 10 wt.%. .

2. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the phenol resin emulsion comprises 5 to 25 wt.% of water-insoluble phenol resin, 0.2 to 6 wt.% of water-soluble polymeric substance, and 3 to 40 wt.% of methyl ethyl ketone, the balance being water.

3. (Deleted)

4. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the water-insoluble phenol resin is a novolak type phenol resin or a mixture of a novolak type phenol resin with a resol type phenol resin.

5. An aqueous vulcanizable adhesive composition according to Claim 4, wherein not more than 200 parts by weight of the resol type phenol resin is used on the basis of 100 parts by weight of the novolak type phenol resin.

6. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the water-insoluble phenol resin is used as a solution at a concentration of 40 to 60 wt.% in methyl ethyl ketone.

7. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the water-soluble polymeric substance is polyvinyl alcohol.

8. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the water-soluble polymeric substance is acetoacetyl-modified polyvinyl alcohol.

9. An aqueous vulcanizable adhesive composition according to Claim

5, wherein an organometallic compound is further contained.

10. An aqueous vulcanizable adhesive composition according to Claim 1, wherein the curing agent for phenol resin is hexamethylene-tetramine.

11. An aqueous vulcanizable adhesive composition according to Claim 10, wherein 0.1 to 5 parts by weight of the hexamethylenetetramine is used on the basis of 100 parts by weight of the phenol resin emulsion.

12. An aqueous vulcanizable adhesive composition according to Claim 10, wherein water is used together with hexamethylenetetramine.

13. (As amended) An aqueous vulcanizable adhesive composition according to Claim 12, wherein not more than 1,000 parts by weight of the water is used on the basis of 100 parts by weight of the phenol resin emulsion.

14. An aqueous vulcanizable adhesive composition according to Claim 1, for use in vulcanization bonding of a metal or resin to rubber.

15. An aqueous vulcanizable adhesive composition according to Claim 14, wherein the rubber is nitrile rubber, hydrogenated nitrile rubber or acrylic rubber.

16. A composite of rubber and metal or resin vulcanization bonded by an aqueous vulcanizable adhesive composition according to Claim 1.

17. A phenol resin emulsion prepared from a water-insoluble phenol resin solution in methyl ethyl ketone and an aqueous water-soluble polymeric substance solution.